

Name: \_\_\_\_\_

PC: Evaluating Limits as  $x \rightarrow \pm\infty$ 

Date: \_\_\_\_\_

Ms. Loughran

Find the numerical value of each limit, or state that the limit does not exist, or is best described as being  $\infty$  or  $-\infty$ .

1.  $\lim_{x \rightarrow \infty} x$

13.  $\lim_{x \rightarrow \infty} \frac{-x^4 + 2x + 1}{x + 10}$

2.  $\lim_{x \rightarrow -\infty} 2x$

14.  $\lim_{u \rightarrow \infty} \frac{u^3 + 3u^2 - 2}{4u^3 - 5u + 3}$

3.  $\lim_{x \rightarrow -\infty} x^2$

15.  $\lim_{x \rightarrow \infty} \sqrt{\frac{3x+5}{6x-8}}$

4.  $\lim_{x \rightarrow \infty} (3x^2 - x - 2)$

16.  $\lim_{x \rightarrow \infty} \frac{x^2 - 16}{x^2 - 5x + 4}$

5.  $\lim_{x \rightarrow \infty} \frac{1}{x}$

17.  $\lim_{x \rightarrow \infty} \frac{x^3}{x-5}$

6.  $\lim_{x \rightarrow \infty} \frac{x+3}{2x-2}$

18.  $\lim_{x \rightarrow -\infty} \frac{1}{x^2}$

7.  $\lim_{x \rightarrow -\infty} \frac{5-x}{x^3+1}$

19.  $\lim_{x \rightarrow \infty} \frac{4x}{2x+3}$

8.  $\lim_{x \rightarrow \infty} \frac{x^2 + 2x - 5}{x + 1}$

20.  $\lim_{x \rightarrow \infty} \frac{x^2}{5-x+3x^2}$

9.  $\lim_{x \rightarrow -\infty} \frac{x^3}{x^2+1}$

21.  $\lim_{x \rightarrow \infty} (x-2)^{-3}$

10.  $\lim_{x \rightarrow \infty} \frac{3x-2}{9x+7}$

22.  $\lim_{x \rightarrow \infty} \frac{7}{x^2} - 4$

11.  $\lim_{x \rightarrow \infty} \frac{6x^2 + 2x - 4}{6x^2 - 3x + 4}$

23.  $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2+2}}{3x-6}$

12.  $\lim_{x \rightarrow \infty} \frac{x^2 + x - 2}{4x^3 - 1}$

24.  $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2+2}}{3x-6}$

### Practice

Find the numerical value of each limit, or state that the limit does not exist, or is best described as being  $\infty$  or  $-\infty$ .

1.  $\lim_{x \rightarrow \infty} \frac{3-x^2}{x}$

13.  $\lim_{x \rightarrow \infty} \frac{x^2-1}{x^2+1}$

2.  $\lim_{x \rightarrow -\infty} -3x$

14.  $\lim_{u \rightarrow \infty} \frac{3u^2-u-2}{5u^2+4u+1}$

3.  $\lim_{x \rightarrow -\infty} -x^2$

15.  $\lim_{x \rightarrow \infty} \sqrt{\frac{4x+5}{8x-7}}$

4.  $\lim_{x \rightarrow \infty} (7x+3)$

16.  $\lim_{x \rightarrow \infty} \frac{8x^3+x}{(2x-1)(2x^2+1)}$

5.  $\lim_{x \rightarrow \infty} \frac{1}{(x-2)^2}$

17.  $\lim_{x \rightarrow \infty} \frac{4x^3-x^2}{(x+1)^3}$

6.  $\lim_{x \rightarrow \infty} \frac{6x^2+3x-8}{2-4x+7x^2}$

18.  $\lim_{x \rightarrow \infty} \left( \frac{1}{x} - \frac{2x}{x-1} \right)$

7.  $\lim_{x \rightarrow -\infty} \frac{x^4}{x^3+7x^2}$

19.  $\lim_{x \rightarrow -\infty} \left( \frac{x-1}{x+1} + 6 \right)$

8.  $\lim_{x \rightarrow \infty} \frac{3x^2+9x-6}{x^3-9x^2-8}$

20.  $\lim_{x \rightarrow -\infty} \frac{4x^2+1}{2+3x^2}$

9.  $\lim_{x \rightarrow -\infty} x^3-5$

21.  $\lim_{x \rightarrow -\infty} (x-1)^{-3}$

10.  $\lim_{x \rightarrow \infty} \frac{2x^3+3}{x^2+5}$

22.  $\lim_{x \rightarrow \infty} \left( 4 - \frac{7}{x^3} \right)$

11.  $\lim_{x \rightarrow \infty} \frac{x^2-x-6}{x^2+x-12}$

23.  $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2+2}}{5x-6}$

12.  $\lim_{x \rightarrow \infty} \frac{6-x^3}{x}$

24.  $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2+2}}{5x-6}$